Date: August 15, 2022

TO:

OFFICE OF THE CLERK
UNITED STATES DISTRICT COURT
NORTHERN DISTRICT OF CALIFORNIA SAN FRANCISCO
450 Golden Gate AVE Box 36060
San Francisco CA 94102-3489

ATTN:

Ms. Anna Sprinkles
DEPUTY CLERK OF THE UNITED STATES DISTRICT COURT

REF:

Auxiliary Case I – Request for Preliminary Evaluation of Ex Parte Motions & Case

Hi Anna,

Hope all is well with you and truly pleased to meet you! Thank you so much for your very thoughtful response on June 21, 2022! Gratefully appreciated that!

My case is that Nicole Prause, a current resident of California, brought in false sexual harassment and false copyright claims to RPI, when I was a student. RPI suspended me for ~88 years (forcing me to withdraw a lawful publication, titled «female sexual responses using signal processing technique», published in the «journal of sexual medicine» or the «JSM paper») and causing unlimited injuries.

PRIVATE AND CONFIDENTIAL

Enclosed please find the preliminary pre-filing materials.

Our understanding is that RPI's newly appointed counsel, Mr. Cook, may be interested to settle our case. My goal is to settle the case as soon as practicable and of course that is not an option.

Would you please postpone all your Court fees, costs & expenses to possibly December 31, 2029? Really appreciate that. Whenever the case is settled, I will pay back all the fees, costs & expenses of your Court, according to the future prices. For instance, if we may reach a settlement agreement in 2027, your Court fees, costs & expenses will be paid then, based on the 2027 prices.

Unfortunately, RPI unlawfully does not release the case materials to us and does not cooperate on the discovery, meet & confer, etc., under the Federal Rules, and we are forced to include many case facts, therefore our cases will be long. Is that okay?

Please feel free to take your time, possibly evaluate the preliminary draft of our first case, and possibly show the JSM paper to your Judge(s).

Would you kindly inform and ask one of your Judges that *RPI does not release the case materials* under the Federal Rules of Civil Procedure and see if a Judge may be willing to sign a [proposed] Court Order, *before the final original complaint is filed*?

I have a confidential Sacramento (CA) address. Instead, please use «jroe1776@gmail.com», which might be easier to communicate.

How would you like to communicate? If you would like to mail any information, please use: «5 Thomas Mellon CIR STE 153 San Francisco CA 94134 USA» and please feel free to leave your voicemails at «332-203-2232».

How would you like parties to communicate? Would you please possibly observe and witness the communication of two parties (either by email or mail)?

Our matters are obviously too complex. Would you like to manage the case «partly informally» or «completely formally»? For instance, if your Court would prefer informal actions, we request a partial summary judgement for our ex parte motion on the fact that «the JSM paper is lawful».

I'm so grateful for your time and help in advance, and we hope you have a very wonderful day!

Roe

J. Roe
5 Thomas Mellon CIR STE 153
San Francisco CA 94134-2502
jroe1776@gmail.com
332-203-2232

PS: The contact info of defendant's counsel and others are:

Rensselaer Polytechnic Institute
110 8th ST Troy BLDG 3rd FL
Troy NY 12180-3590 USA
ATTN: Mr. Craig A. Cook, General Counsel & Secretary
Phone: 518-276-8829
Email: cookc5@rpi.edu

Rensselaer Polytechnic Institute
110 8th ST Troy BLDG 3rd FL
Troy NY 12180-3590 USA
ATTN: Ms. Sandra Brown, Associate General Counsel
Phone: 518-276-4238
Email: browns16@rpi.edu

Rensselaer Polytechnic Institute
110 8th ST Troy BLDG 3rd FL
Troy NY 12180-3590 USA
ATTN: Ms. Mary Coonradt, Executive Assistant to General Counsel
Phone: 518-276-3777
Email: coonrm@rpi.edu

FROM:

J. Roe (STUDENT ID NO. [redacted])
ADDRESS IS CONFIDENTIAL AND
PROTECTED UNDER THE LAW;
jroe1776@gmail.com

TO:

Rensselaer Polytechnic Institute
110 8th ST Troy BLDG 3rd FL
Troy NY 12180-3590 USA

COUNSEL:

Craig A. Cook, Office of the General Counsel & Secretary

ATTN(S):

Martin A. Schmidt, Ph.D., Office of the President
Arthur F. Golden, JD, Chair of the Board of Trustees
Wanda Denson-Low, JD, Vice Chair of the Board of Trustees
Curtis R. Priem, Secretary of the Board of Trustees
Prabhat Hajela, Office of the Provost
Curtis N. Powell, Office of the Vice President of Human Resources
John E. Kolb, Office of the Vice President, Information Services and Technology and Chief Information Officer
Stanley M. Dunn, Office of the Vice Provost, Dean of Graduate Education
Dennis E. Gornic, Office of the Graduate Education
Travis T. Apgar, Office of the Dean of Students
Shekhar S. Garde, Office of the Dean of Engineering
David V. Rosowsky, Former Dean of Engineering

TITLE: INFORMATIVE COOPERATIVE SETTLEMENT

(I) PARTIES

(a) Plaintiff. Plaintiff is a former student of RPI, a resident of the County of San Francisco, State of California.

(b) Defendant. Defendant is a private university with a headquarter campus in the County of Rensselaer, State of New York.

(II) COOPERATIVE SETTLEMENT

This informative instrument is not an offer, is to inform the Defendant that Plaintiff is in communication with the Courts regarding our cases of "Roe v. RPI" (to be filed) and has received a response from the Courts.

Plaintiff has never moved adversely against Defendant or any other entity. However, the following evidence suggests that Defendant is moving adversely against Plaintiff by blocking Plaintiff's access to Rensselaer Self-Service Information System (hereinafter "RSSIS"), which Plaintiff had access to, prior to January 20, 2022, and because in January 9, 2022, Plaintiff disclosed extensive cooperative evidence to Defendant's General Counsel within an Official Notice of Violation, thereupon Defendant used said evidence and adversely closed RSSIS for "Former Constituents", rather than resolving the matters:

Rensselaer Self-Service Information System

As of January 20, 2022, Former Constituents no longer have access to SIS/RSS.

Former Students or Employees- please email your RIN, full name and information needed to:
Students: Registrar
Employees: Human Resources

Current Students/Employees: Rensselaer Self-Service Login with Multi-Factor Authentication

Cases of "Roe v. RPI" –upon filing– will unfavorably affect both Parties, which Defendant shall be responsible for. Therefore, Plaintiff, in the most humble terms, suggests that an urgent undisclosed settlement may be appropriate to protect both Parties and all other third-parties, among other *undisclosed* reasons.

In short, Plaintiff will urgently consider an Undisclosed Non-Binding Settlement Agreement to Agree ("UNBSAA"), if Defendant may agree to draft and prepare an UNBSAA, at their own risk and cost. Via an UNBSAA, Defendant shall execute:

(a) deposition of one check for *partially covering damages of Plaintiff* with a non-negotiable amount of ———————— and no later than July 31, 2022; and

(b) permanent access to [redacted]e@rpi.edu, transcripts and RSSIS of Plaintiff.

This *ante litem* instrument expires in 30 days without any further notification.

Very Respectfully Submitted,

Date: 07/09/2022

Signature: Roe

Name: "J. Roe"

CONFIDENTIAL

FROM:

J. Roe (STUDENT ID NO. [redacted])

ADDRESS IS CONFIDENTIAL AND

PROTECTED UNDER THE LAW;

jroe1776@gmail.com

TO:

Rensselaer Polytechnic Institute

110 8th ST Troy BLDG 3rd FL

Troy NY 12180-3590 USA

COUNSEL:

Craig A. Cook, Office of General Counsel & Secretary

ATTN(S):

Martin A. Schmidt, Ph.D., Office of the President

Arthur F. Golden, JD, Chair of the Board of Trustees

Wanda Denson-Low, JD, Vice Chair of the Board of Trustees

Curtis R. Priem, Secretary of the Board of Trustees

Prabhat Hajela, Office of the Provost

Curtis Powell, Office of Vice President of Human Resources

John Kolb, Office of Vice President, Information Services and Technology and Chief Information Officer

Stanley Dunn, Office of Vice Provost, Dean of Graduate Education

Travis Apgar, Office of Dean of Students

Shekhar Garde, Office of Dean of Engineering

CONFIDENTIAL

TITLE: DUE NOTICE OF LITIGATION

(I) PARTIES[1]

(a) Plaintiff. Plaintiff is a former student of RPI, a resident of the County of San Francisco, State of California.

(b) Defendant. Defendant is a private university with a headquarter campus in the County of Rensselaer, State of New York.

(II) NOTICE

This notice of litigation is hereby served as an informative instrument to the Defendant that Plaintiff intends to file *a series of cases* against Defendant, and that the Counsel of Defendant and their appropriate offices are priorly informed and properly notified.

(III) BREIF

The details are as follows:

(a) cases will be filed in the Federal Courts, in the County of San Francisco;

(b) venue is proper;

(c) cases are timely;

(d) cases are not instant;

(e) Plaintiff will submit reasonable requests to Defendant from time to time (e.g., discovery process);

(f) Plaintiff will respond to reasonable requests or requirements of Defendant;

(g) communication, negotiation and settlement of the cases remains open; and

(h) Plaintiff does not require judicial formalities.

---

[1] Parties certify that any and all the information herein are under the penalty of perjury and that said information shall be true and correct, and if inadvertently false, the liable party or any other involved entities, if applicable, shall inform all the parties forthwith, via email or mail, and otherwise overlook if such inadvertent defects are de minimis. Pursuant to 18 U.S.C. § 1001, parties certify that if any entity knowingly and willfully, (1) falsifies, conceals or covers up by any trick, scheme, or device a material fact, (2) makes any materially false, fictitious, or fraudulent statement or representation, or (3) makes or uses any false writing or document knowing the same to contain any materially false, fictitious, or fraudulent statement or entry, may be liable to a $10,000 fine or 5 years imprisonment, or both.

If Defendant objects or dissents to any issue, email communication within 3 business days is considered by Plaintiff.

Very respectfully submitted,

Date: 07/01/2022

Signature: J Roe

Name: "J. Roe"

FROM:

J. Roe (STUDENT ID NO. [redacted]
ADDRESS IS CONFIDENTIAL AND
PROTECTED UNDER THE LAW;
jroe1776@gmail.com

TO:

Rensselaer Polytechnic Institute
110 8th ST Troy BLDG 3rd FL
Troy NY 12180-3590 USA

COUNSEL:

Craig A. Cook, Office of General Counsel & Secretary

ATTN(S):

Martin A. Schmidt, Ph.D., Office of the President
Arthur F. Golden, JD, Chair of the Board of Trustees
Wanda Denson-Low, JD, Vice Chair of the Board of Trustees
Curtis R. Priem, Secretary of the Board of Trustees
Prabhat Hajela, Office of the Provost
Curtis Powell, Office of Vice President of Human Resources
John Kolb, Office of Vice President, Information Services and Technology and Chief Information Officer
Stanley Dunn, Office of Vice Provost, Dean of Graduate Education
Dennis Gornic, Office of Graduate Education
Travis Apgar, Office of Dean of Students
Shekhar Garde, Office of Dean of Engineering

CONFIDENTIAL

TITLE: ACCELERATED DISCOVERY

(I) PARTIES

(a) Plaintiff. Plaintiff ("Discoverer") is a former student of RPI, a resident of the County of San Francisco, State of California.

(b) Defendant. Defendant ("Discoveree") is a private university with a headquarter campus in the County of Rensselaer, State of New York.

(II) REQUEST FOR COOPERATIVE DISCOVERY

This is to request electronic or non-electronic copies of any and all information of Discoverer from 2008 to this date – within any and all assets of Discoveree, including but not limited to the Offices of Graduate Education (managed by Mr. Stanely Dunn and Mr. Dennis Gornic), Offices of Students (formerly managed by Mr. Mark Smith and currently managed by Mr. Travis Apgar), Offices of Engineering (formerly managed by Mr. David Rosowsky and currently managed by Mr. Shekhar Garde) and any other assets of Discoveree, and to request electronic access to the email address and Rensselaer Self-Service Information System (SIS) username of Discoverer (managed by Mr. John Kolb).

(III) BREIF

Upon the Federal Laws, this cooperative discovery request is hereby transmitted to Discoveree, to be completed no later than 30 days.

Please note that the Federal Courts encourage that the discovery of electronically stored information (hereinafter "ESI") shall be performed by the parties under the rule 1 of the Federal Rules of Civil Procedure such that "… to secure the just, speedy, and inexpensive determination of every action and proceeding …", among others (see Fed. Rules Civ. Proc., rule 1, 28 U.S.C.; see also 28 U.S.C. Part V chs. 115, 117 & 119; 18 U.S.C. ch. 223; 5 U.S.C. § 552; and 7 CFR § 2.25 (a)(1) *et seq.*). The Federal Courts recommend informal or formal cooperation among the parties on issues associated to preservation, collection and production of ESI, among other issues, for which *judicial intervention is unnecessary*. Therefore,

(a) temporary access to Rensselaer Self-Service Information System is *very respectfully* requested;

(b) temporary access to the email address of Discoverer (i.e., [redacted]e@rpi.edu) is *very respectfully* requested; and

(c) any and all files with any formats (e.g., text, voice, video) containing – whether partially or fully– any and all information of Discoverer or any information that Discoverer may be a relevant party of, from January 2008 to July 2022, is *very respectfully* requested.

If Discoveree dissents to any issues, or if Discoveree has any requirements, or for any other reasons, email communication within 3 business days is requested and acceptable by Discoverer.

Very respectfully submitted,

Date: 07/05/2022

Signature: Roe

Name: "J. Roe"

	THE UNITED STATES OF AMERICA	January 9, 2022
	IN GOD WE TRUST	Official Notification of Violation
	THE STATE OF CALIFORNIA	Action Opens

[redacted]
San Francisco CA [redacted] USA
[redacted]@gmail.com

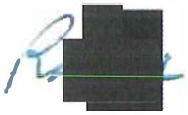
Mr. Craig A. Cook
Rensselaer Polytechnic Institute ("RPI")
Office of the General Counsel & Secretary
110 8th ST Troy BLDG 3rd FL
Troy NY 12180-3590 USA
cookc5@rpi.edu
518-276-8829

Mr. Cook,

This is an official notification of violation to notify you that RPI is in the violation of Title IX, the Copyright Law, Confidentiality, Privacy, Diversity, Discrimination, Title 20 — Education — Laws, among others, as it pertains to specifically two counts of Administrative Holds, among others, on Rensselaer Identification Number, [redacted], and RPI is in the possession of significant amount of information and evidences, and resulting incurred and incurring damages are in excess of $[redacted] million.

Please act, as appropriate.

Respectfully,
[redacted]



★★★★★★★★★★★★	THE UNITED STATES OF AMERICA	January 9, 2022
★★★★★★★★★★★★	IN GOD WE TRUST	Official Notification of Violation
★★★★★★★★★★★★	THE STATE OF CALIFORNIA	Action Opens

We, the undersigned, certify that all the information herein are under the penalty of perjury that said information shall be true and correct, and if inadvertently false, the liable party or any party, if applicable, shall inform the other party forthwith, via email or mail, and otherwise overlook if such inadvertent defects are de minimis.

Pursuant to 18 U.S.C. § 1001, we certify that if any individual *knowingly and willfully*,

(1) falsifies, conceals or covers up by any trick, scheme, or device a material fact;

(2) makes any materially false, fictitious, or fraudulent statement or representation; or

(3) makes or uses any false writing or document knowing the same to contain any materially false, fictitious, or fraudulent statement or entry;

may be liable to a $10,000 fine or 5 years imprisonment, or both.

J[redacted] R[redacted]e	[redacted]	1/9/2022
Individual ("Petitioner ")	**Signature**	**Date**
Rensselaer Polytechnic Institute ("Respondent")	**Signature**	**Date**

ORIGINAL RESEARCH—ANATOMY/PHYSIOLOGY

Female Sexual Responses Using Signal Processing Techniques

J. Roe Author 2 Author 3

J[redacted] R[redacted]e, MSc,* [redacted], MSc,* and [redacted], MA†

*Rensselaer Polytechnic Institute—Department of Mechanical, Aerospace and Nuclear Engineering, Troy, NY, USA;
†Rensselaer Polytechnic Institute—School of Humanities, Arts, and Social Sciences, Troy, NY, USA

DOI: 10.1111/j.1743-6109.2009.001452.x

ABSTRACT

Introduction. An automatic algorithm for processing vaginal photoplethysmograph signals could benefit researchers investigating sexual behaviors by standardizing interlaboratory methods. Female sexual response does not co-vary consistently in the self-report and physiological domains, making the advancement of measurements difficult. Automatic processing algorithms would increase analysis efficiency. Vaginal pulse amplitude (VPA) is a method used to measure female sexual responses. However, VPA are problematic because of the movement artifacts that impinge on the signal. This article suggests a real-time approach for automatic artifact detection of VPA signals. The stochastic changes (artifacts) of VPA are characterized mathematically in this research, and a method is presented to automatically extract the frequency of interest from VPA based on the autocorrelation function and wavelet analysis. Additionally, a calculation is presented for the vaginal blood flow change rate (VBFCR) during female sexual arousal using VPA signals.

Aim. The primary aim is to investigate the experimental VPA measures based on theoretical techniques. Particularly, the goal is to introduce an automatic monitoring system for female sexual behaviors, which may be helpful for experts of female sexuality.

Methods. The methods in the research are divided into experimental and theoretical parts. The VPA in twenty women was measured by a common vaginal photoplethysmography system in two conditions. Each subject was tested watching a neutral video followed by an erotic video. For theoretical analysis, an approach was applied based on wavelet transform to process the VPA.

Main Outcome Measures. Introduction of an automatic and real-time monitoring system for female sexual behaviors, automatic movement artifact detection, VBFCR, first application of wavelet transform, and correlogram in VPA analysis.

Results. The natural and significant frequency information of VPA signals was extracted to automatically detect movement artifacts and to investigate the effects of erotic videos on female sexual responses.

Conclusions. The computerized automatic systems based on advanced math and statistics have several advantages for human sexuality research such as: savings in time and budget; increase in the accuracy of results; and reduction in human errors for data analysis. [redacted] **Female sexual responses using signal processing techniques. J Sex Med 2009;6:3086–3096.**

Key Words. Female Sexual Responses; Female Sexual Arousal; Vaginal Photoplethysmography; Vaginal Pulse Amplitude; Vaginal Blood Flow Change Rate; Erotic Video; Movement Artifact Detection; Psychophysio Signal Processing; Feature Extraction; Wavelet; Autocorrelation; Time-Frequency Analysis; Time Series Analysis; Daubechies 44

Introduction

Human sexual arousal is unique in psychophysiology for its specificity [1,2], but considerable debate exists concerning the methods for measuring female sexual response [3]. The accurate and reliable measurement of female physiological sexual arousal has been complicated by a lack of understanding of biological processes that contribute to the female sexual arousal response. For example, the function of differing urethrovaginal thickness currently is being characterized [4]. In the past, female sexual arousal has been measured by thermography [5], labial temperature [6], labial photoplethysmography [7], clitoral Doppler [8], and more commonly with vaginal photoplethysmography. Most devices are thought to indirectly measure changes in genital blood flow, which is thought to contribute to genital engorgement associated with sexual arousal.

With the advent of the vaginal plethysmograph system [9], the researchers achieved quick progress in various areas of gynecology [10–23], showing the significance of this measure. However, vaginal photoplethysmography, by far the most frequently used proxy of physiological sexual arousal, has been criticized for both practical and theoretical reasons. Because of the high sensitivity of the sensor, movement artifacts throughout the recorded signals have been a challenge in this area. Scientists have commonly removed the movement artifacts by hand-scoring [24]. The prior methods are still useful for and applicable to vaginal pulse amplitude (VPA) analysis. VPA signals most typically are quantified as the average pulse amplitude (peak-to-trough) within a time or condition bin. However, there have been a few efforts to characterize the signal using other methods. Fast Fourier transform is perhaps the most common, though an infrequent, alternative method for quantifying VPA. Several articles characterizing the spectral tension of VPA suggested that the peak energy value be used [25]. This approach would be problematic because of the impact of artifacts. Artifacts are not restricted to a particular frequency band [26]. Levin and Wylie have suggested a different quantification method based on the supposition that vasomotion drives apparent changes in vasodilation [27]. Their method includes examining the ratio of high to low VPA peaks, and has not yet been replicated. Others have used hierarchical linear modeling for investigating concordance of VPA with self-report [28], which might require initial artifact screening based on binned amplitude measures.

Wavelet transform, which is a simultaneous time frequency [29] and the developed version of short-time Fourier transform or windowed Fourier transform, has been introduced by [redacted] et al. in VPA analysis [30]. The first publication about the application of wavelet transform in VPA processing was presented in a article on psychophysio-signal processing concept at the 35th annual Northeast Bioengineering Conference at the MIT–Harvard Division of Health in 2009 [30]. The same group reported the application of wavelet transform for electroencephalogram (EEG) signals recorded for psychophysiological purposes [31]. After that, Prause et al. [26] used wavelet transform to automatically remove the movement artifacts in VPA. This automatic method is a great collaboration of a clinical psychologist and signal processors, although VPA artifact removal based on the proposed denoising method by signals reconstruction would not be mathematically appropriate from few aspects, and needs to be improved upon. In their research, the VPA would be cleaned of movement artifacts by the proposed method, but at the expense of losing raw VPA data in the whole signal. Figure 6 in their article illustrates the slight changes in data that should be unaffected by artifact removal when their cleaning method is utilized. The movement artifacts will be removed faster than manual methods as Prause et al. [26] reported. Other drawbacks of the algorithm proposed by Prause et al. [26] include improper selection of wavelet basis and type of transform.

In contrast, this article suggests an original technique to automatically detect movement artifacts in VPA signals without changing the rest of the VPA. The techniques investigated are not dependent on individual signal or subject characteristics, which indicate generalizability across laboratory hardware and participant samples. The index is referred to as the vaginal blood flow change rate (VBFCR) to reflect the measure of time-sensitive blood flow change, as compared to previous studies, which may use average condition values and probability tests.

Methods

Participants

Participation for this research [26] was solicited through newspaper ads and flyers requesting volunteers for a study of sexual response. To be eligible, participants needed to have no problem becoming sexually aroused before the study. Volun-

Table 1 Demographics of participants [26]

Variable	Number (%)	Mean (standard deviation)
Age		23.5 (3.3)
Lifetime sexual intercourse partners		16.4 (27.8)
Years of education		15.3 (1.7)
Ethnicity		
European American	18 (78.3)	
African American	3 (13.0)	
Asian	1 (4.3)	
Hispanic	1 (4.3)	
How important is religion?		
Very important	3 (13.6)	
Important	8 (36.4)	
Slightly important	4 (18.2)	
Not important	7 (31.8)	

teers were informed that the research would require watching erotic videos, consuming alcohol, and recording physiological sexual arousal. All candidates were offered the opportunity to preview the lab prior to deciding to participate, although none of them accepted. Participants were not pregnant and were tested in the follicular phase. Although VPA data was recorded from the participants after they consumed alcohol, this data was not used for this research. Twenty-two women participated in the clinical tests (see Table 1). The data from two participants were excluded from additional processing, one because the VP sensor was dislodged during testing, and the second because incomplete data were captured during the test [26].

Film Stimuli

Participants were shown 3-minute excerpts from sexual videos. These excerpts showed a consensual, erotic, heterosexual encounter, edited to equal parts kissing/foreplay, oral sex being performed on the man and then the woman, and penile–vaginal intercourse. To establish a baseline, a documentary about underwater creatures [22] was shown for 15 minutes before the start of the sexual video [26].

Procedure

The participants received written information that explained the experimental procedures in detail so that their decision to participate could be an informed one. Vaginal photoplethysmography and the sterilizing procedures were explained to the participants. A trained female experimenter was used to test participants individually. Upon arrival at the laboratory, participants read and signed an informed consent form and completed a questionnaire about sexual experiences. All details of the experimental procedure were explained again, and participants inserted the vaginal probe in a private room [26].

Measure

Vaginal Photoplethysmograph

The vaginal photoplethysmograph monitors the changes in backscattered light in the vaginal canal to reflect sexual arousal. An embedded light source, usually infrared, generates a light signal that is reflected back to a receiving photocell. The received signal is interpreted as an index of vasocongestion, although it is likely to reflect several poorly-characterized physiological processes in the vagina [7]. The signal pulses with heartbeats, which typically are around 60 bpm in the laboratory, and slow waves concordant with breathing rate are evident in many participants, which may be influenced by vaginal canal length.

Two signals typically are extracted. The first is the DC signal, which provides an index of the total amount of blood. The second is the AC signal, abbreviated as VPA, which reflects phasic changes in the vascular walls that result from pressure changes within the vessels. Both signals have been found to be sensitive to responses to erotic stimulation [32]. However, the construct validity of VPA is better established [33] and is used in this study. VPA was collected using the Biopac (model MP100 (Biopac Systems, Inc. Goleta, CA, USA)) data acquisition system. The signal is first bandpass filtered between 0.5 and 30 Hz. The sampling rate was fixed at 80 Hz.

The power spectral density (PSD), which is a common mathematical tool based on Fourier transform to convert time domain data to frequency domain, is illustrated in Figure 1 for two classes of VPA to demonstrate the frequency contents of VPA in two classes. The differences between the frequency contents are mainly caused by the movement artifacts.

Nature of VPA Signals

A signal is stationary if its properties, such as the mean and variance, are constant throughout time. VPA signals, which are a time series signal reflecting phasic changes in vaginal engorgement based on heartbeats [32], are classified as *almost stationary* signals as the properties of these signals are not completely constant throughout time. This feature makes the processing of the signals complicated in time-domain. Therefore, simultaneous time-

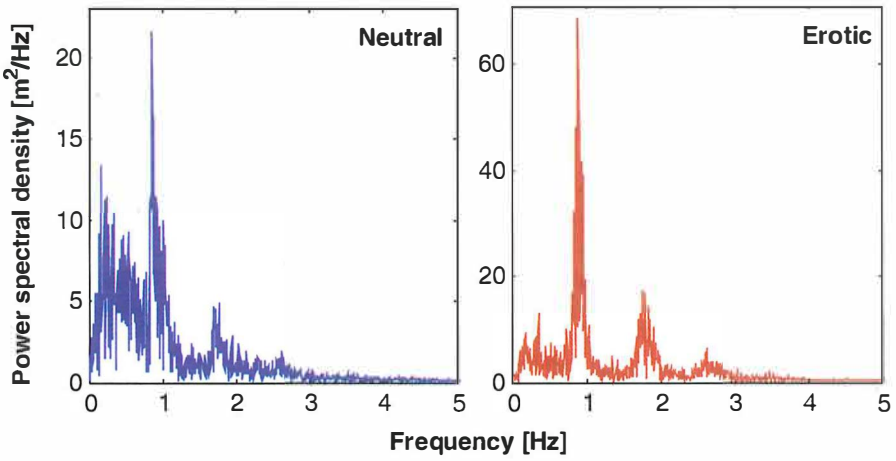


Figure 1 Power spectral density of recorded vaginal pulse amplitude in two classes from one subject.

frequency wavelet analysis [29], the developed version of short-time Fourier transform or windowed Fourier transform, was used to extract the significant features of VPA. VPA can be further categorized as dynamic signals, which are either periodic or aperiodic. A complex periodic signal has more than one period. VPA are complex periodic signals.

Data Analysis

The recorded VPA [26] are analyzed using MATLAB software (The MathWorks, Inc, Natick, MA, USA). The developed signal processing technique is applied to analyze recorded VPA in this research. The common purpose of signal processing techniques is to extract compact and meaningful features from the bulky signals. For example, in this research we have 180×80 data points for 180 seconds of recorded VPA with a sampling frequency of 80 Hz for each class. A sequence of mathematical algorithms is used to extract meaningful information from the large signals in a short amount of time. For preprocessing of the signals, one goal could be noise removal, which is mainly related to movement artifacts in this case. Meaningful feature extraction would be referred to extraction of VBFCR for this case. The proposed algorithm, which is further explained below, has compacted the VPA signals by a factor of 80. This means that one number is extracted for every 80 data points of recorded VPA. This number is used for the calculation of the proposed VBFCR.

VPA Segmentation

The first step to preprocess VPA is to segment the recorded signals into smaller units. The segmented signals are actually the smaller parts of the whole recorded signals, making the calculation easier. Segmentation is more significant when making a real-time system. For example, if signals are broken up into 30-second segments, each calculation requires 30 seconds of delay for signal capturing, as well as processing time. If we reduce the segmentation time to one second, calculations take one second to record, plus processing time. Smaller segments make the system faster in real time. In this case, a one second segmentation time, which is close to heartbeat frequency, would be a proper choice.

In signal processing, depending on the processing task, which could be offline or online, segmentation can be taken into consideration. For example, if the process is offline, the larger segments could be considered for signal segmentation. To find the similar wavelet, the recorded VPA signals are segmented into 12-second signals as the calculations are offline. Therefore, each 3-minute class of VPA is divided into 15 segmented signals (15×12 seconds) in order to find the most similar mother wavelet function across VPA [30]. The mother wavelet selection is quite independent of VPA computations in this research.

For automatic frequency identification and artifact detection, VPA are segmented into one-second units in order to have not only time limitation of real-time processing, but also more precise focus on time-domain throughout 3 minutes for artifact detection (see Figure 2).

Continuous Wavelet Transform (CWT)

Wavelet transform, the developed version of short-time Fourier transform or windowed Fourier transform, is a fast algorithm, capable of variable resolution in both time- and frequency-domains, and it can be principally divided into discrete and continuous forms [34]; the former is faster because of low computational time, but the

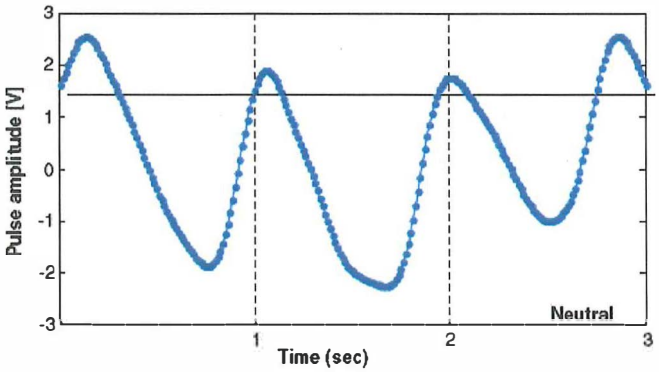


Figure 2 Segmented vaginal pulse amplitude signals in neutral class recorded from one subject.

continuous form has more efficiency and reliability. CWT is applied to analyze VPA signals in this research and further theoretical discussion is referred to 10 lectures on wavelets [29].

Wavelet transform has been used to process of a broad variety of signals [35] in various areas, such as neuroscience [36], mechanics [37], medicine [38], and biology [39]. In this research, we introduce the application of wavelet transform for female sexual responses [30].

We used CWT, which generates continuous wavelet coefficients (CWCs) illustrating how well a wavelet function correlates with a signal. More simply, if the signal energy and the wavelet energy are equal to one, wavelet coefficient may be interpreted as a correlation coefficient. Correlation is a common statistical measure describing the degree of linear dependence between two variables in terms of a coefficient between −1 and +1. The closer the coefficient is to either −1 or +1, the stronger the correlation between the two variables is. The negative and positive signs of the coefficients indicate the direction of the linear dependence. The coefficient 0 implies that the two variables are completely linearly independent of each other.

Most signal decomposition [40] can be classified as either pyramid or packet. In both methods, signals are divided into approximation (low frequency) and detail (high frequency) in the first level. In pyramid decomposition, only approximations are decomposed into higher levels after the first level. However, in packet decomposition, both approximation and detail are decomposed into further levels. Therefore, packet decomposition offers richer content of signals. In VPA analysis, the packet decomposition of continuous form of wavelet has been used. The interpreted outcome of correlation between signal and mother wavelet function, or CWC, was established as the foundation of our theoretical analysis.

Wavelet transform decomposes a signal into high and low frequencies, and can continue to do so until the proper decomposition level is selected. Therefore, the signal processors can extract the significant information by examining the signals in both time and frequency domains simultaneously. This is different from Fourier transform, in which the information from time domain is lost.

The CWC, the interpreted outcome of correlation between signal and mother wavelet function was established as the foundation of our theoretical analysis. Selection of mother wavelet function and scales are two significant factors in wavelet analysis [37,41]. The most similar mother wavelet function across VPA signals was searched. Three hundred twenty-four mother wavelet candidates were studied from different families as further explained in [42]. Results show that Daubechies 44 (db44) is the most similar function across our VPA in two classes (see Figure 3). This function is the right existing function for VPA analysis whereas the technique is based on the similarity between wavelet function and VPA signal. There is no need to repeat the calculations for other datasets. Another drawback in the work done by Prause et al. could be the selection of Coiflet 5 function, which barely used for this sort of low frequency signals. We also selected the fifth decomposition level to decompose the VPA.

Autocorrelation Function

As a result of self cross-correlation of a one-dimensional finite energy signal $s(t)$, which sums all point–point similarities of the signal with a time delay of τ, autocorrelation function [43] quantifying the relationship between different components of the signal $s(t)$ is defined as follows:

$$R_s(\tau) = s * s = \int_{-\infty}^{+\infty} s(t)s(t+\tau)\,dt \qquad (1)$$

where * is convolution operation, meaning that autocorrelation is a convolution of a function with

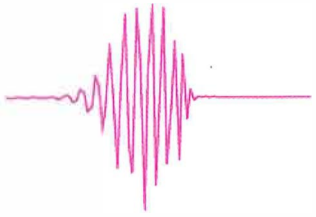


Figure 3 Schematic of Daubechies 44 function.

itself. Equation 1 expresses the basic concept of autocorrelation function.

In fact, the autocorrelation function is a diagnostic tool for analyzing time series in the time domain. Autocorrelation plots, called correlograms, present a better understanding of the evolution of a process through time by the probability of relationship between data values separated by a specific number of time steps (lags). The correlogram, which is used in our theoretical analysis, plots autocorrelation coefficients on the vertical axis, and lag values on the horizontal axis. In this research, a combination of autocorrelation and wavelet transform is used to process VPA signals [37].

Algorithm for VBFCR and Automatic Artifact Detection

In this research, we suggest the calculation for the VBFCR, which can be interpreted as the change of blood flow in subjects while stimulated (e.g., watching an erotic video). The VBFCR is calculated separately for each subject. The reason for separately calculating the VBFCR for each subject is that VPA signals are completely subject-dependent, and may change depending on weight, heart beats, size of vagina, age, or other physiological factors [44]. The baseline is selected as the average of VPA recorded during the last 5 seconds of neutral video in each class, excluding artifacts. The baseline is defined for each subject based on the data recorded from the same subject. This approaches the VBFCR towards a more precise approximation. The computational algorithm of the VBFCR is summarized as follows:

1. VPA signals are segmented into one-second units. Therefore, there are 180 segmented signals for each class of the VPA. CWC of the segmented VPA is calculated using db44 function and the fifth decomposition level for each segmented signal in each class, which leads to 2^5 scales of CWC.
2. Calculated CWC is autocorrelated. The application of autocorrelation in wavelet coefficients was introduced in 2009 by R[redacted]e and Tse as a powerful new tool for feature extraction [37]. This improves a few deficiencies in continuous wavelet analysis, such as the generation of too much signal information. Trial-and-error based lag is fixed at 40 in the autocorrelation plot. The mean of the absolute value for each series of CWC is called weight to be a measure of the strength of the VPA signals.
3. This step reveals the significant frequency information of VPA. PSD of the autocorrelated CWC are multiplied by the weight for each of the 32 scales. For simplicity, these calculated values are called feature for the VBFCR and movement artifact detection algorithms. Movement artifacts can be generally divided into three small-impact, medium-impact (MI), and high-impact (HI) artifacts. There are slight changes (small artifacts) that make the VPA signals slightly nonstationary (almost stationary). Small artifacts are not discussed in this research. MI and HI artifacts are classified based on visual perception and are not standardized based on numerical calculations. However, having comprehensive clinical data would lead to mathematical standardization of the artifacts, which is not considered in this research. In this research, small-impact artifacts do not significantly affect the calculation of VBFCR. MI and HI artifacts are illustrated in Figure 4A, B, respectively, which have higher amplitudes compared with normal portions of the VPA. To make the plots more apparent in the article, segmentation time was increased to

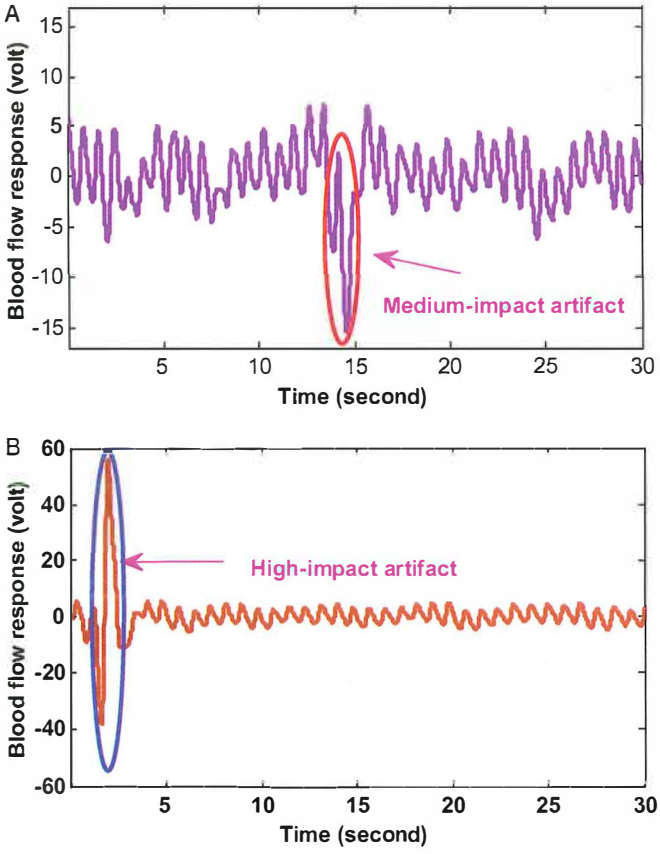


Figure 4 (A) Medium-impact movement artifact [30]. (B) High-impact movement artifact [30].

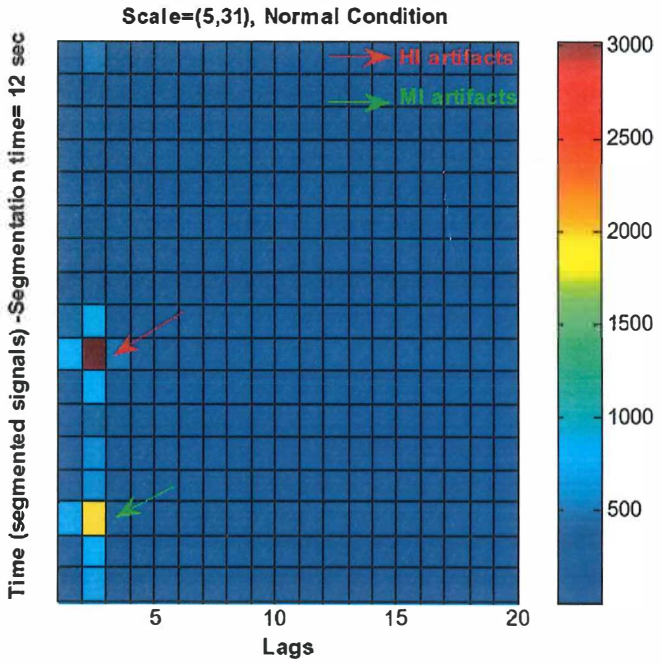


Figure 5 Power spectral density of autocorrelated continuous wavelet coefficient in six classes: 18 segmented signals, lag = 40, scale = (5,31). HI = high impact; MI = medium impact.

12 seconds (e.g., see Figure 5 for one subject). Figure 5 represents a three-dimensional plot, with three axes. The *x*- and *y*- axes are visible on the page, and the third axis, which could be perpendicular to the page, is represented by colors. Dark red colors have the greatest value, and dark blue represents the lowest values, as seen in the key next to the figure. Each box represents one value. As shown, all significant time-frequency information is revealed in the second lag (depicted on the *x*-axis), so this lag is used for calculation of VBFCR. The other lags are eliminated from further processing. As mentioned, one goal in signal processing is to reduce the insignificant information and extract the helpful information. By extracting the significant information from lag 2 and eliminating the other lags, which have a tremendously low impact on the calculation, this goal is reached.

For the purposes of this figure, the segment lengths have been stretched from 1 to 12 seconds. However, for a real-time monitoring system the segmentation time is 1 second in our research and natural and significant frequencies of VPA appear in the second lag in all scales. As mentioned, lag was fixed at 40. Therefore, in PSD, we plot only the first half of the lag, as the halves are symmetrical (e.g., see Figure 5).

4. Feature calculated from the last segment of the VPA is compared with those calculated from the other VPA segments for the VBFCR algorithm. In other words, the 180 values represented by the second lag in Figure 5 are used to calculate the VBFCR. Each value is divided by the same value calculated for the baseline, and these 180 new values are obtained for each of the 32 scales used in this research (2^5 scales, where 5 is the level of decomposition). Therefore, there are 32 values for each of the 180 new calculated numbers. To create the final VBFCR plot, the average of the 32 values in time-domain leads to the 180 values shown by dots for each class in final VBFCR plot (see Figure 6A–C). The final VBFCR plot can be useful for female sexuality research [45–47].

As shown in Figure 6A, each class consists of 180 values. In neutral, the VBFCR values tend to be about one. That means there is not much change in VPA while the subject watches neutral videos. However, the vaginal blood flow increases as time increases during erotic videos (see Figure 6C). If the VBFCR is 1, it means there is no change in VPA over that time relative to the baseline. If the VBFCR is greater than 1, VPA changes relative to the fixed baseline and we have stronger VPA in that segment. This index is computed for each subject separately (using her baseline, when the subject is watching the last second of neutral video) as VPA signals vary from person to person. The average of the VBFCR in all scales is computed and plotted for each subject. The slope of the mean VBFCR plot across time (*x*-axis) is called VBFCR in each scale (e.g., see Figure 6A, B). The VBFCR is only meaningful while the subjects are sexually aroused as the VPA signals may not change during the neutral videos in this research. The VBFCR plot can also show the movement artifacts as depicted in Figure 6C as well. VBFCR could help clinical psychologists compare the rate and level at which blood flow changes in different subjects, allowing for more research and a better understanding of female sexual function/dysfunction. They can also examine the amount of time it takes for the subject to return to baseline blood flow.

Results and Discussion

An algorithm was suggested for automatic artifact detection. A calculation was proposed for VBFCR, which may be helpful for female sexuality research.

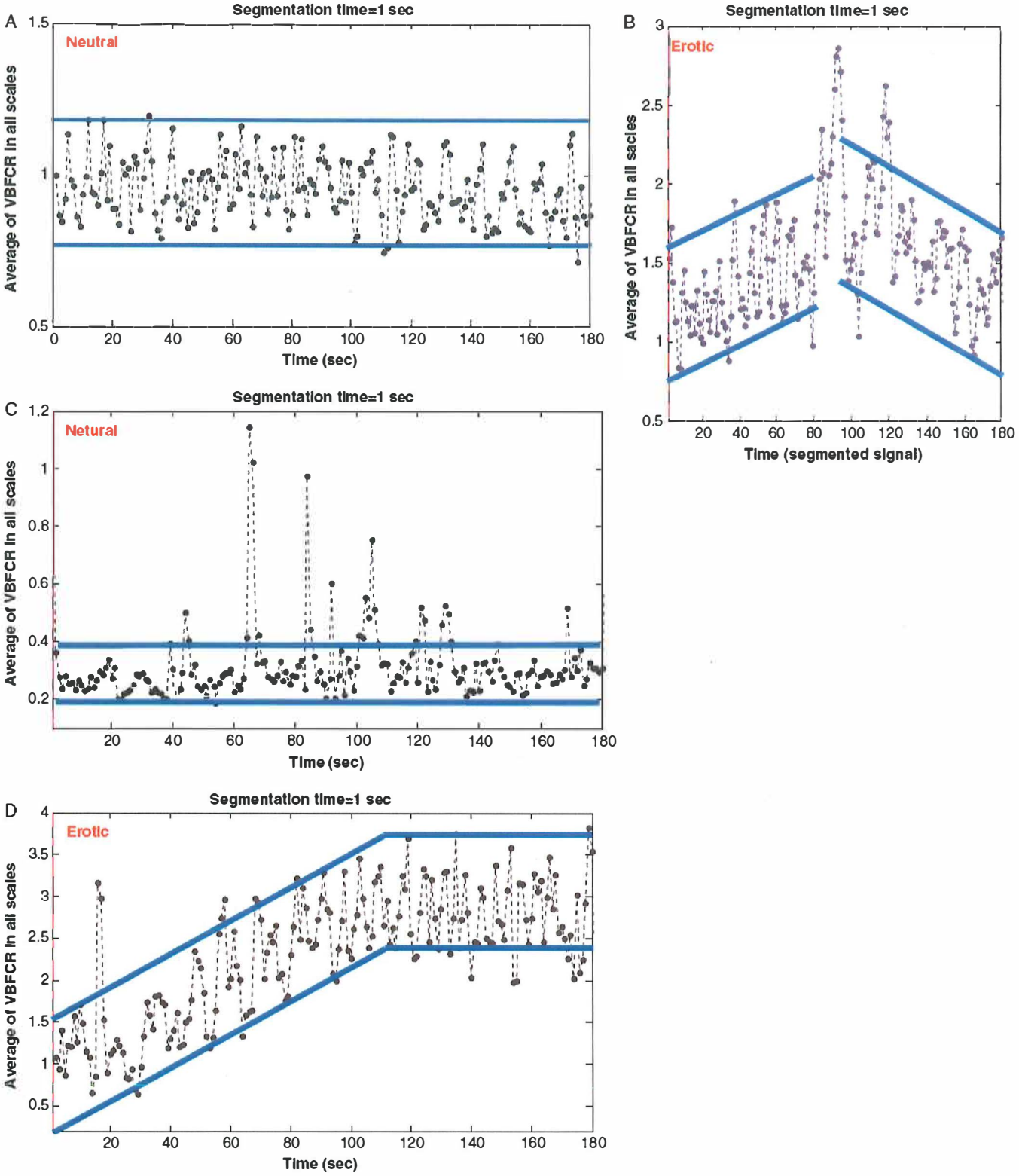


Figure 6 (A) Average of vaginal blood flow change rate (VBFCR) of each class during 180 seconds for one subject. (B) Average of VBFCR of erotic class during 180 seconds for one subject. (C) Average of VBFCR of neutral class for one subject. (D) Average of VBFCR of erotic class for one subject.

The advantage of the algorithm is the automatic calculation attribute. These algorithms can be run on the computer while recording laboratory data from the subject. The data (VPA) can automatically go through the calculations and the results can be monitored or printed simultaneously with data recording in a few seconds (such as electrocardiograms). For example, if there is a need to record a

100-second VPA from a subject, using the algorithm the VPA will automatically plot the VBFCR in approximately 103 seconds with a common PC, while simultaneously recording the VPA.

Results show that the VBFCR increases faster while a subject is watching the early section of the erotic video. In the last seconds of the erotic video, the VBFCR increases slower than in the early times (see Figure 6D). Also, a few participants have shown unexpected VBFCR patterns (see Figure 6B). For example, the VBFCR goes up in the early times of the erotic video, changes slower in the middle times, and decreases in the late times for one of the subjects in the E 0.025 condition. Therefore, it shows that the proposed algorithm is also able to estimate the aroused females' recovery time to the baseline (see Figure 6B). The VBFCR in the neutral VPA should be more constant (see Figure 6A) than those recorded during the erotic video (see Figure 6B, C).

The automatic algorithm is able to clean 100% of the movement artifacts. However, manual detection of movement artifacts is also used to compare with the automatic method. The manual artifact detection was done in MATLAB software based on visual identification of the dramatic and stochastic changes of the VPA signal amplitudes [28]. Three signal processors were trained to clean the stochastic changes of VPA visually. After this training, they analyzed two sets of data. Each set contained the recorded VPA of five subjects viewing erotic videos. In the first trial, the signal processors had an accuracy rate of 98%, 96%, and 100%. In the second trial, their accuracy rates were 100% for all. In contrast, the automatic algorithm is able to detect 100% of the movement artifacts for VPA data.

Conclusions

The proposed technique has a few general advantages. Based on such methods, there may be savings in time and budget, an increase in the accuracy of results, and a reduction in human errors during data analysis. These types of computer-based advanced mathematical techniques would be highly applicable for the future. Mentioning the exact specific practical applications confidently would be difficult at this point. These automatic computations could be helpful for female sexuality research. Generally speaking, the automatic and real time computation would be applicable not only in VPA, but also in other measures [30], such as EEG [48], vaginal surface electromyography [19], and so on. This technique could be helpful in the area of ocular artifact detection in EEG signals [49]. This research presents results which can be summarized as follows:

1. Our research indicated no tangible change in VPA signals for the class of neutral video. It also showed that vaginal blood flow changes (measured using VPA) are increased while subjects viewed the erotic video.
2. Based on the proposed algorithm, a real-time female sexual monitoring system could possibly be utilized to aid in human sexuality research.
3. The research verifies that db44 is a proper function across psychophysio-VPA signals.
4. Future research with more subjects [50] is needed to conduct more comprehensive experimental VPA analysis, which may confirm the results and make them more generalizable.
5. Suggested VBFCR needs to be verified by more theoretical and experimental psychophysiological research to determine its potential as an applicable feature in the future [51–53].
6. The impact of artifacts is also subjective. Some of the subjects have larger signal amplitudes while moving. These could be more standardized with data from a greater pool of subjects.

Acknowledgments

Many researchers have kindly supported this research, but it would be impossible to name them all. The authors are especially grateful to Nicole Prause at Idaho State University for providing clinical data and valuable comments throughout the paper. They would also like to extend their appreciation to Melissa A. Farmer, Meredith Chivers, Stephanie Both, Cindy Meston, and Ellen Laan for their support and cooperation. They are also appreciative of the thoughtful and constructive comments of anonymous reviewers, and offer special thanks to them for spending their valuable time to improve this article.

Roe

Corresponding Author: J[redacted] R[redacted]e, MSc, Mechanical, Aerospace and Nuclear Engineering, Rensselaer Polytechnic Institute, Multidisciplinary Design Lab, Department of Mechanical, Aerospace and Nuclear Engineering, Jonsson Engineering Center, 110 8th Street, Rensselaer Polytechnic Institute, Troy, NY 12180-3590, USA. Tel: [redacted]3; Fax: [redacted]; E-mail [redacted]@rpi.edu

Conflict of Interest: None.

Statement of Authorship

Category 1

(a) Conception and Design

J[redacted] R[redacted]e; [redacted]

Roe **Author 2**

(b) Acquisition of Data "ITP"
Clinical trials used in this research have been kindly supported by Dr Nicole Prause at Idaho State University, Idaho, USA.

(c) Analysis and Interpretation of Data
[redacted] e; [redacted]
Roe Author 2

Category 2

(a) Drafting the Manuscript Author 2 Author 3
Roe [redacted] e; [redacted]; [redacted]

(b) Revising It for Intellectual Content Author 3
Roe [redacted] e; [redacted]; [redacted]
Author 2

Category 3

(a) Final Approval of the Completed Manuscript
Roe [redacted] e; [redacted]; [redacted]
Author 2 Author 3

References

1 Kinsey AC, Pomeroy WB, Martin CE, Gebhard PH. Sexual behavior in the human female. Philadelphia, PA: Saunders; 1953.
2 Heiman JR. A psychophysiological exploration of sexual arousal patterns in females and males. Psychophysiology 1977;14:266–74.
3 Levin RJ. Sex and the human female reproductive tract-what really happens during and after coitus. Int J Impot Res 1998;10:S14–21.
4 Gravina GL, Brandetti F, Martini P, Carosa E, Di Stasi SM, Morano S, Lenzi A, Jannini EA. Measurement of the thickness of the urethrovaginal space in women with or without vaginal orgasm. J Sex Med 2008;5:610–8.
5 Kukkonen TM, Binik YM, Amsel R, Carrier S. Thermography as a physiological measure of sexual arousal in both men and women. J Sex Med 2007;4:93–105.
6 Henson DE, Rubin HB. A comparison of two objective measures of sexual arousal of women. Behav Res Ther 1978;16:143–51.
7 Prause N, Cerny J, Janssen E. The labial photoplethysmograph: A new instrument for assessing genital hemodynamic changes in women. J Sex Med 2005;2:58–65.
8 Munarriz R, Maitland S, Garcia SP, Talakoub L, Goldstein I. A prospective duplex Doppler ultrasonographic study in women with sexual arousal disorder to objectively assess genital engorgement induced by EROS therapy. J Sex Marital Ther 2003;29:85–94.
9 Sintchak G, Geer JH. A vaginal plethysmograph system. Psychophysiology 1975;12:113–5.
10 Laan E, Everaerd W. Determinants of female sexual arousal: Psychophysiological theory and data. Annu Rev Sex Res 1995;6:32–76.
11 Sipski ML, Alexander CJ, Rosen RC. Orgasm in women with spinal cord injuries: A laboratory-based assessment. Arch Phys Med Rehabil 1995;76:1097–102.
12 Meston CM, Heiman JR. Ephedrine-activated physiological sexual arousal in women. Arch Gen Psychiatry 1998;55:652–6.
13 Rosen RC, Phillips NA, Gendrano NC, Ferguson DM. Oral phentolamine and female sexual arousal disorder: A pilot study. J Sex Marital Ther 1999;25:137–44.
14 Exton MS, Bindert A, Krüger T, Scheller F, Hartmann U, Schedlowski M. Cardiovascular and endocrine alterations after masturbation-induced orgasm in women. Psychosom Med 1999;61:280–91.
15 Maas CP, Ter Kuile MM, Laan E, Tuijnman CC, Weijenborg PTM, Trimbos JB, Kenter GG. Objective assessment of sexual arousal in women with a history of hysterectomy. BJOG 2004;111:456–62.
16 Chivers ML, Bailey JM. A sex difference in features that elicit genital response. Biological Psychology 2005;70:115–20.
17 Bradford A, Meston CM. The impact of anxiety on sexual arousal in women. Behav Res Ther 2006;44:1067–77.
18 Diamond LE, Earle DC, Heiman JR, Rosen RC, Perelman MA, Harning R. An effect on the subjective sexual response in premenopausal women with sexual arousal disorder by Bremelanotide (PT-141), a melanocortin receptor agonist. J Sex Med 2006;3:628–38.
19 Both S, Laan E. Simultaneous measurement of pelvic floor muscle activity and vaginal blood flow: A pilot study. J Sex Med 2007;4:690–701.
20 Laan E, van Driel EM, van Lunsen RHW. Genital responsiveness in healthy women with and without sexual arousal disorder. J Sex Med 2008;5:1424–35.
21 Van Der Made F, Bloemers J, Yassem WE, Kleiverda G, Everaerd W, Van Ham D, Olivier B, Koppeschaar H, Tuiten A. The influence of testosterone combined with a PDE5-inhibitor on cognitive, affective, and physiological sexual functioning in women suffering from sexual dysfunction. J Sex Med 2009;6:777–90.
22 Prause N, Heiman J. Assessing female sexual arousal with the labial thermistor: Response specificity and construct validity. Int J Psychophysiol 2009;72:115–22.
23 Van Anders SM, Brotto L, Farrell J, Yule M. Associations among physiological and subjective sexual response, sexual desire, and salivary steroid hormones in healthy premenopausal women. J Sex Med 2009;6:739–51.
24 Laan E, van Lunsen RHW, Everaerd W. The effects of Tibolone on vaginal blood flow, sexual desire and arousability in postmenopausal women. CLIMACTERIC 2001;4:28–41.

25 Wouda J, Hartman P, Bakker R, Bakker JO, van de Wiel HBM, Schultz WCMW. Vaginal plethysmography in women with dyspareunia. J Sex Res 1998;35:141–7.
26 Prause N, Williams K, Bosworth K. Automated wavelet-based denoising of vaginal pulse amplitude. Psychophysiology 2009. In press.
27 Levin RJ, Wylie K. Vaginal Vasomotion—Its appearance, measurement, and usefulness in assessing the mechanisms of vasodilatation. J Sex Med 2008;5: 377–86.
28 Rellini AH, McCall KM, Randall PK, Meston CM. The relationship between self-reported and physiological measures of female sexual arousal. Psychophysiology 2005;42:116–24.
29 Daubechies I. Ten lectures on wavelets, CBMS-NSF Series in Applied Mathematics (SIAM), 1991.
30 R[redacted]e J, R[redacted] MA, Prause N. Biosignals: Psychophysio-signal processing concept. Proceeding of IEEE 35th Annual Northeast Bioengineering Conference, Harvard-MIT Division of Health Sciences & Technology, Cambridge, MA, USA, April 3–5, 2009.
31 R[redacted]e J, Schoen MP, Prause N, Urfer A, R[redacted] MA. A comparison of forearm EMG and psychophysical EEG signals using statistical signal processing. 2nd IEEE International Conference on Computer, Control and Communication, Karachi, Pakistan, February 17–18, 2009.
32 Geer JH, Morokoff P, Greenwood P. Sexual arousal in women: The development of a measurement device for vaginal blood volume. Arch Sex Behav 1974;3:559–64.
33 Laan E, Everaerd W, Evers A. Assessment of female sexual arousal: Response specificity and construct validity. Psychophysiology 1995;32:476–85.
34 Daubechies I. Orthonormal bases of compactly supported wavelets. Commun Pure Appl Math 1988;41: 909–96.
35 Rioul O, Vetterli M. Wavelets and signal processing. IEEE Signal Process Mag 1991;8:14–38.
36 Olshausen BA, Field DJ. Emergence of simple-cell receptive field properties by learning a sparse code for natural images. Nature 1996;381:607–9.
37 R[redacted]e J, Tse PW. Use of autocorrelation in wavelet coefficients for fault diagnosis. Mech Syst Signal Process 2009;23:1554–72.
38 Unser M, Aldroubi A. A review of wavelets in biomedical applications. Proc IEEE 1996;84:626–38.
39 Arneodo A, Bacry E, Graves PV, Muzy JF. Characterizing long-range correlations in DNA sequences from wavelet analysis. Phys Rev Lett 1995;74: 3293–6.
40 Mallat SG. Theory for multiresolution signal decomposition: The wavelet representation. IEEE Trans Pattern Anal Mach Intell 1989;11:674–93.
41 R[redacted]e J, Tse PW, Harifi A, Sadeghi MH. A novel technique for selecting mother wavelet function using an intelligent fault diagnosis system. Expert Syst Appl 2009;36:4862–75.
42 R[redacted]e J, R[redacted]e MA, Prause N, Tse PW. Application of Daubechies 44 in machine fault diagnostics. 2nd IEEE International Conference on Computer, Control and Communication, Karachi, Pakistan, February 17–18, 2009.
43 Box GEP, Jenkins GM, Reinsel GC. Time series analysis: Forecasting and control. 3rd edition. Upper Saddle River, New Jersey: Prentice Hall; 1994.
44 O'Connell HE, Eizenberg N, Rahman M, Cleeve J. The anatomy of the distal vagina: Towards unity. J Sex Med 2008;5:1883–91.
45 Hamilton LD, Fogle EA, Meston CM. The roles of testosterone and alpha-amylase in exercise-induced sexual arousal in women. J Sex Med 2008;5:845–53.
46 Harte CB, Meston CM. The inhibitory effects of nicotine on physiological sexual arousal in nonsmoking women: Results from a randomized, double-blind, placebo-controlled, cross-over trial. J Sex Med 2008;5:1184–97.
47 Helpman L, Greenstein A, Hartoov J, Abramov L. Genito-sensory analysis in women with arousal and orgasmic dysfunction. J Sex Med 2009;6:1039–44.
48 Jung T-P, Makeig S, Humphries C, Lee T-W, Mckeown MJ, Iragui V, Sejnowski TJ. Removing electroencephalographic artifacts by blind source separation. Psychophysiology 2000;37:163–78.
49 Gratton G, Coles MGH, Donchin E. A new method for off-line removal of ocular artifact. Electroencephalogr Clin Neurophysiol 1983;55:468–84.
50 Rosen RC, Taylor JF, Leiblum SR, Bachmann GA. Prevalence of sexual dysfunction in women: Results of a survey study of 329 women in an outpatient gynecological clinic. J Sex Marital Ther 1993;19: 171–88.
51 Rosen R, Brown C, Heiman J, Leiblum S, Meston C, Shabsigh R, Ferguson D, D'Agostino R Jr. The Female Sexual Function Index (FSFI): A multidimensional self-report instrument for the assessment of female sexual function. J Sex Marital Ther 2000;26:191–208.
52 Derogatis LR, Rosen R, Leiblum S, Burnett A, Heiman J. The Female Sexual Distress Scale (FSDS): Initial validation of a standardized scale for assessment of sexually related personal distress in women. J Sex Marital Ther 2002;28:317–30.
53 Basson R, Althof S, Davis S, Fugl-Meyer K, Goldstein I, Leiblum S, Meston C, Rosen R, Wagner G. Summary of the recommendations on sexual dysfunctions in women. J Sex Med 2004;1:24–34.